

HYGIENE OF THE NERVOUS SYSTEM.

Why Worry? By Dr. G. L. Walton. Pp. 275. (London: W. Heinemann, 1909.) Price 2s. 6d. net.

Self-Help for Nervous Women: Familiar Talks of Economy in Nervous Expenditure. By Dr. J. K. Mitchell. Pp. 202. (London: W. Heinemann, 1909.) Price 2s. 6d. net.

MUCH that a few generations ago it was usual to attribute to disorder of conduct is, by many, now placed in the category of functional nervous disturbance, and concomitantly it has been sought to relieve judicial and ecclesiastical officers of their duties and to devolve them upon the medical profession. In the two small books under review we find, expressed in popular language, that which amounts to a series of short sermons written by medical men, and for the most part addressed to those who are suffering from the effects of a lack of self-control. For one of our authors it is "not his aim to transform the busy man into a philosopher of the indolent and contemplative type," but to enable him to do his work effectively by eliminating undue solicitude. The other defends himself from the possible criticism that his advice is not new. We cannot suppose any such defence will be necessary. The advice proffered is that of Epictetus, Marcus Aurelius, and Seneca, but stops short, we may presume out of respect for the attitude of current science towards current religion, at the plane of these philosophers.

Dr. Mitchell points out how some of the conspicuous and peculiar virtues of women may become sources of trouble. Strong affections and sympathy are apt to lead to emotional excess, and such excess, whether spent in grief, love, hate, or ambition, is the most extravagant form of nervous expenditure, and may eventuate in bankruptcy. A very frequently predisposing cause of nervousness is the too ready yielding to emotional expression, along with the cultivation of an excessive manifestation of emotion in speech and manner. Many women account it an attraction to give way to tears for trifling pains, or to loud complaints expressed in exaggerated language about small annoyances, and it is pointed out to these that to endure the smaller inevitable woes with equanimity is to form a habit which shall be of immense service when the larger troubles arise.

Much useful advice is given upon those physical causes which tend to develop nervous manifestations, or to exaggerate them when they are already present. On one hand there is a large number of persons who attribute many trifling derangements of various organs to their "nerves," and, on the other hand, there are others who fail to recognise their disorders as being nervous in origin until severe mental symptoms arise, and each class will find the information which may be gathered from these books of great help. Due attention, neither too prolonged nor too scanty, to the hygiene of the nervous system will in the future doubtless go as far as prophylactic hygiene has already gone in connection with the other systems, and it must be recognised that the education of the child is in this connection of paramount importance. Something between Spartan severity and

the opposite extreme, to which there seems to be a serious danger of our passing, is the educational goal to which we should press, to the development of that degree of self-control which shall avert the nervous weakness which issues in each petty emotion usurping entire control over the body.

For those who are "nervously" disposed we can ask for no better advice than that given in the small volumes before us, and we should certainly feel assured that those who would read the books and would endeavour to act upon the suggestions therein contained were well on the road to recovery. Unfortunately, there is an enormous residue of patients who will listen to no advice, though they pay a man to give it them, and yet another class which, while recognising the advice given to be sound, seems wholly incapable of the amount of self-help requisite to acting upon it.

MYCOLOGICAL WORKS.

(1) *Researches on Fungi.* By Prof. A. H. Reginald Buller. Pp. xi+287. (London: Longmans, Green and Co., 1909.) Price 12s. 6d. net.

(2) *Die Wurzelpilze der Orchideen, ihre Kultur und ihr Leben in der Pflanze.* By Dr. Hans Burgeff. Pp. iv+220; 3 plates, and 38 figs. in text. (Jena: Gustav Fischer, 1909.) Price 6.50 marks.

(3) *Fungi and How to Know Them: an Introduction to Field Mycology.* By E. W. Swanton. Pp. xi+210. (London: Methuen and Co., 1909.) Price 6s. net.

(1) DR. BULLER'S investigations, undertaken with the object of throwing light upon the production, liberation, and dispersion of spores in the group of fungi known as the Hymenomycetes, breaks new ground, and, as usual in such instances, will undoubtedly form the starting point of future research on the part of many students. A brief sketch of the components of a typical hymenium or spore-bearing surface are first dealt with. It is pointed out that swollen gill-margins serve to separate the gills, otherwise the spores could not be shed. This may be true in those instances where thickened gill edges exist, but in at least seventy-five per cent. of known agarics the edge of the gills is not in the least thickened.

Under nuclear phenomena it is pointed out that the passage of the nucleus from the basidium through the very narrow sterigma into the spore affords striking evidence of protoplasmic plasticity. This point has been previously emphasised by Wager. The classification of the Agaricineæ according to spore colour is dubbed as a purely artificial arrangement, but no valid reason for this statement is forthcoming. The author does not appear to realise that what the systematist understands by black spores are spores thrown down in the mass; no spores are black, even under the microscope, but they may be opaque, and consequently appear to be black.

In a work devoted to research it is generally assumed that the author is conversant with what has been done previously on the same subject; this, however, does not hold good in the present instance; for

example, the occasional sterility of the gills, which consequently remain colourless in species normally producing coloured spores, has already been discussed in more than one text-book, and the conclusion arrived at is identical with that advanced by Dr. Buller. Cystidia are included in the category of hair formations. Probably the definitions as to the origin of hairs are various, but certainly true cystidia—not to be confounded with swollen marginal cells—originate from deep-seated cells.

Coming to the crucial point of research, the liberation of spores, it is at once obvious that the author attempts generalisations on too narrow a basis, as proved by the following quotation:—

“Excepting a few gelatinous species which require further investigation, it is a general rule that in Hymenomycetes the hymenium is situated on the under side of the fruit bodies.”

He has ignored, or does not realise, the existence of many hundreds of species included in the Hymenomycetes where the hymenium is on the upper surface of the sporophore, and pointing upwards, as in *Corticium*, many species of *Stereum*, *Hymenochaete*, *Poria*, &c., yet such species are as numerous and cosmopolitan in distribution as the species with which he is acquainted.

In the Agaricineæ and the Polyporeæ it is considered that the position of the hymenium on the under-surface of the sporophore has been primarily decided as affording the greatest facility for spore dispersion. The spores are very adhesive when fresh, hence to secure successful liberation the gills or tubes must occupy a vertical position, which is secured by the rigidity of the sporophore. Gravity is the principal orienting stimulus acting on the sporophore. The spores on a basidium are discharged successively; each spore is shot out violently to a distance of about $\frac{1}{10}$ mm., and afterwards falls vertically downwards. The horizontal projection of the spores necessitates that gills should be placed at a certain distance apart. The process of spore liberation is treated in detail. Some very ingenious and interesting observations on the rate of fall of spores are furnished, which, subject to modification owing to their size, specific gravity, and process of desiccation, ranges from 0.3 to 6.0 mm. per second. The specific gravity of spores is determined approximately by using heavy fluids contained in a counting apparatus. In the genus *Coprinus* the gills are usually stated to deliquesce, or melt into a black, inky fluid, and it was generally assumed that the spores were contained in this fluid. According to Buller, however, the spores are shot off and fall as in other Agarics, commencing at the margins, and when a narrow zone of the gill is depleted of spores, the naked portion of the gill is consumed by a process of autodigestion. A most interesting account of the means by which the spores falling from a fruit-body may be seen by the use of a concentrated beam of light is given, but perhaps the most unexpected phenomenon explained is the fact that the sporophores of certain fungi retain their vitality for years in a dried condition, and, after the application of wet cotton-

wool, quickly revive and begin to shed their spores, a process which continues for some days.

It is estimated that the giant puff-ball produces 7,000,000,000,000 spores, also that only one spore out of about 20,000,000,000 spores ever succeeds in producing a mushroom capable of reproduction. In addition to the many valuable new discoveries and new theories bearing on subjects previously investigated by other observers, the book abounds with suggestions and sidelights which cannot but prove of immense service to future workers.

Ten plates and numerous excellent figures in the text are of much value in following and grasping clearly the various points raised by the author.

(2) Notwithstanding the extensive researches of Frank, Bernard, and others bearing on the relationship between fungi and the roots of phanerogams, resulting in the structures known respectively as ectotrophic and endotrophic mycorrhiza, much yet remains to be done before we are in a position to formulate the significance of such combinations. Dr. Burgeff has contributed considerably to our knowledge in this respect, and has added many new facts bearing on the nature and life-history of those fungi met with in the roots of orchids. Fifteen different kinds of fungi were isolated and carefully studied from pure cultures. The majority of these produced asexual reproductive bodies, mainly under the form of long chains of minute conidia of the oidium type. No higher form of fruit was observed, hence the systematic position of these root-fungi yet remains to be determined.

Wahrlich's view that certain of the fungi found in the roots of orchids belonged to the genus *Nectria* has not been corroborated by Burgeff. Sclerotia are sometimes produced. On account of the general resemblance of orchid fungi to those of *Rhizoctonia*, Bernard placed all the forms he isolated from orchids under the last-named genus. Burgeff, on the other hand, has created a new genus—*Orcheomycetes*—for the reception of his various forms, which are named specifically after the host from which they were isolated; thus the form isolated from *Ophrys apifera* becomes *Orcheomycetes apiferae*. The wisdom of creating new generic and specific names for admitted form-species is doubtful, more especially as the author states that such names have no systematic importance or significance. The group characters are based on the behaviour and mode of growth of the fungus, as a pure culture, on the substratum. The specific features turn on the nature of the hyphae, form and size of conidia, some of which are comparatively large, and in some instances there are indications of the formation of pycnidia.

All the described forms are of endotrophic origin, truly ectotrophic mycorrhiza occurring only very seldom in orchids.

The question of nutrition in cultures was investigated, and the important fact noted that no assimilation of free nitrogen took place. All the species are aerobic.

The concluding part of the work deals with the

infection of the seed, and the future development of the fungus until the host reaches maturity.

Numerous excellent figures illustrate the different kinds of fungi isolated, also the progress of the fungus from its first entrance into the seed.

(3) An introduction to field mycology was a desideratum, and, unfortunately, still remains to be written. The present work is practically an imperfect mycological *vade mecum*, attempting to deal with every phase of the subject, instead of being confined to an introduction to field mycology, as stated in the subtitle. The first chapter deals with the general structure and morphology, and has obviously been culled from preceding works of very different dates, as some of the information is up to date, some of historical interest only, and some inaccurate, as the statement that in the Ascomycetes the paraphyses are probably abortive asci. Immediately following this statement it is announced that the paraphyses are a continuation of the vegetative hyphæ, which is a fact, and consequently precludes the possibility of their being abortive asci. Interesting chapters on the dispersal of spores, parasitism, habitats, &c., follow. The remarks anent edible and poisonous species consist of platitudes, and leave the student in doubt. The Jew's ear is not an esteemed esculent in some countries, but *Hirneola polytrichi*, an allied species, is.

Coming to the essential portion of the book, it is at once apparent that the author is one of those who consider that the name of a fungus is a point of primary importance; in fact, there is but little indication that anything else is of any importance. In dealing with the systematic side of a subject, it is universally conceded that the student should be first introduced to the primary groups, and approach by degrees to entities or species. The reverse order, however, is followed in the work under consideration. Families and genera are simply dealt with briefly by a key system, which the beginner cannot possibly grasp, whereas the species are described in detail, the result being that if the species are recognised at all, it will be by a rule-of-thumb method, and his knowledge of affinities will remain at zero. Experience has shown that when a student commences the study of mycology by dealing first with individual species, his knowledge rarely extends beyond recognising a given fungus by name. It is doubtless the same in other branches of science.

The specific descriptions are very uneven, some being technical and beyond the grasp of the beginner; others are altogether inadequate, whereas in the Ascomycetes no mention is made of the asci or spores, the only features of real importance. The statement that *Bulgaria polymorpha*, an ascigerous fungus, is the conidial form of *Ulocolla foliacea* might be regarded as a slip if many other equally glaring mistakes did not suggest lack of knowledge of the subject undertaken. The illustrations are numerous, consisting of sixteen coloured and thirty-two black-and-white plates. Many of the figures are good, some are poor, and some are mere parodies of the object they are intended to represent.

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ELEMENTARY CHEMISTRY.

- (1) *Elementary Chemistry*. By Hollis Godfrey. Pp. xiv+456. (New York and London: Longmans, Green and Co., 1909.) Price 4s. 6d. net.
- (2) *Systematic Qualitative Analysis*. By Dr. R. M. Caven. Pp. xii+240. (London: Blackie and Son, Ltd., 1909.) Price 3s. 6d. net.

(1) WE have carefully read a considerable part of Mr. Hollis Godfrey's book, and have reluctantly come to the conclusion that as an elementary text-book it is not a complete success. It is true that the book contains much useful information, which is well arranged, that it is well printed and luxuriously illustrated, and that its general appearance is attractive; but the explanations are slovenly, the similes are childish, the historical references betray a curious ignorance of the original memoirs, and many of the illustrations, excellent though they are as photographs, are peculiarly inept.

We have, for example, a picture of an apple to represent "acids in nature," two views of a rather nondescript landscape to illustrate "earth compounds," a female haymaker looking at her watch with a haystack in the background to explain atmospheric pressure, another party of haymakers looking at a tiny spot in one corner of the picture (a balloon presumably) to indicate the lightness of hydrogen, and so on.

A few extracts will illustrate the other points above mentioned. "Chemistry is a science which explains the every-day things of life" (p. 2). "There are seventy or eighty different atoms" (p. 9), meaning of course, different kinds of atoms. As a kind of corollary to this the author states that "since masses are made by the union of molecules, there exist only between seventy and eighty perfectly simple substances, &c.," forgetting a previous paragraph in which he defines a hypothesis as a belief, and the more important fact that the elements would continue to exist independently of any atomic hypothesis.

The same kind of loose treatment is extended to volume and weight.

"If we have the same volume, the same size piece, so to speak, we can tell at once whether one substance is heavier or lighter than another. But unless we have the same volumes we can tell very little about it" (p. 23).

Again, on p. 40, it is stated,

"A hot-air balloon rises because the air within the balloon bag heated by the flame, expands, grows less in weight and so pulls the light envelope up."

We have still to learn that dough rises owing to the growth of the yeast cells (p. 281). The relation of oxygen to ozone is compared to a man who disguises himself and assumes another name when engaged in crime. The catalytic action of manganese dioxide on potassium chlorate is compared to a person working in the dark and then in daylight.

"The sun comes out and floods the room with cheerful radiance. The man's hands work faster—swifter and swifter grow his motions, &c."

The references to the history of chemistry may be illustrated by the following extracts. We are told (p. 28),